Supplemental Material for Proposed Amendments to Chapter 1200-3-3
Ambient Air Quality Standards – Hydrogen Fluoride

1. Petition requesting that the existing rule be amended

2. Letter from the United States Environmental Protection Agency stating that the existing ambient hydrogen fluoride standards are not federally enforceable.

3. Excerpt from a United States Environmental Protection Agency document entitled Primary Aluminum: Guidelines for Control of Fluoride Emissions from Existing Primary Aluminum Plants, which states "atmospheric fluorides are not a problem to people or animals in the United States."

4. Excerpt from a United States Department of Health, Education, and Welfare document entitled Criteria for a Recommended Standard Occupational Exposure to Hydrogen Fluoride, which states "the standards (ambient hydrogen fluoride) were not established on the basis of the protection of human health, but on the basis of damage to livestock and vegetation."

PETITION TO THE
TENNESSEE AIR POLLUTION CONTROL BOARD

Filed with:)
)
Richard A. Bolton,)
In his official capacity as Vice-Chair,)
Tennessee Air Pollution Control Board,)
L&C Tower,)
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PETITION FOR A RULEMAKING AMENDING THE SECONDARY AMBIENT AIR QUALITY STANDARD FOR HYDROGEN FLUORIDE

I. Requested Action

Pursuant to T.C.A. § 4-5-201, Petitioners, as listed below, hereby submit this petition for rulemaking and request that the Tennessee Air Pollution Control Board (Air Board) amend the regulations for secondary ambient air quality standards for hydrogen fluoride (HF) as set forth at Tenn. Comp. R. & Regs. 1200-3-3-.03.

The petitioners respectfully request that a new paragraph Tenn. Comp. R. & Regs. 1200-3-3-.03(1) be amended by renumbering the existing language as 1200-3-3-.03(1)(b)1 and adding a new paragraph (b)2. The new paragraph would provide as follows:

> Sources that emit HF and that are within a source category (including sources that would otherwise be included in the source category but fall below emissions or size thresholds for the source category) for which the United States Environmental Protection Agency has promulgated standards under section 112 of the Clean Air Act are deemed to be in compliance with any requirements under this section if they meet any and all applicable requirements of the federal standards.

The Air Board is authorized to adopt and amend the regulations pursuant to T.C.A. §§ 68-201-105 and 4-5-201.

The proposed amendment will harmonize the Environmental Protection Agency's (EPA's) federal air toxics program and the earlier adopted state secondary standard.

II. Petitioners

Crossville, Inc. is an Illinois corporation with its registered office located at 7502 South Main Street, Crystal Lake, Illinois 60014. The Crossville, Inc petitioners represent each its three facilities in Tennessee, which employ approximately 425 persons.

Petitioner Boral Bricks Inc. is a Georgia corporation located at 1630 Arthern Road, Augusta, Georgia 30901. Boral's Tennessee facility is located in Gleason, Tennessee. Boral employs about 50 persons in the State of Tennessee.

General Shale Brick, Inc. is a Delaware corporation located at 3211 North Roan Street, Johnson City, Tennessee 37601. The petitioners from General Brick represent its manufacturing facilities in Tennessee, which together employ over 500 persons.

III. Statement In Support of Petition

A. Regulatory Background

Tennessee's ambient air quality standard for HF is a secondary air quality standard. Primary air quality standards define levels of air quality believed adequate, within an appropriate margin of safety, to protect public health. Tenn. Comp. R. & Regs. 1200-3-3-.01. Conversely, secondary standards define levels of air quality believed adequate, within an appropriate margin of safety, to protect the public welfare from any known anticipated adverse effects of the pollutant. Tenn. Comp. R. & Regs. 1200-3-3-.02. Therefore, Tennessee regulates HF because of the potential for adverse effects on public welfare, such as damage to farm crops, vegetation, or buildings; the current regulations were not imposed because of the potential for adverse health effects.

The ambient air standards listed in Tennessee's rules are applicable throughout Tennessee. The standards are as follows:

Averaging Interval	ppb	*ppm	ug/m^3	*mg/m^3
30 days	1.5	0.0015	1.2	0.0012
7 days	2.0	0.002	1.6	0.0016
24 hours	3.5	0.0035	2.9	0.0029
12 hours	4.5	0.0045	3.7	0.0037
* Value not actually set forth in the Tennessee HF Standard, but derived by conversion of units.				

Tenn. Comp. R. & Regs. 1200-3-3-.03(1)(b) (2003).

Tennessee has a separate secondary standard for gaseous fluorides expressed as HF in the vicinity of Primary Aluminum Reduction Plants in operation before December 31, 1973. That standard is set at 0.5 ug/m^3 based on a thirty-day average. Tenn. Comp. R. & Regs. 1200-3-3-.03(1)(d). This petition does not address compliance with subparagraph (d).

B. The proposed amendment will harmonize EPA's federal air toxics program, stated Air Board policy and the earlier adopted state secondary standard.

1. The State Air Toxics Policy

Petitioners seek an amendment to the current secondary HF standards to reconcile the federal hazardous air pollutant standards with the Tennessee secondary standard for the subject source categories. Petitioners contend that their compliance with the federal maximum achievable control technology (MACT) requirements, should be sufficient to comply with Tennessee's secondary standard.

The amendment is also consistent with the Air Pollution Control Board's stated policy approach on addressing hazardous air pollutants regulated under EPA's toxics program. The Air Pollution Control Board has previously determined:

> (1) that the federal Environmental Protection Agency has the technical capacity and resources to make the appropriate evaluations under the federal MACT program; and
>
> (2) that the federal MACT program is protective of human health.

Tennessee Air Pollution Control Board, Board Order 98-020, November 12, 1997.

The Board further concluded that if the state were to develop any air toxics standards for the state it should not address those substances that are covered by the federal MACT program and that the Technical Secretary was instructed to rely upon the federal MACT program to the maximum extent possible in regulating hazardous air pollutants for existing sources. *Id.*

As the state's secondary ambient standard for HF was developed prior to the development of the listing of HF as a HAP by EPA, and the Board's policy directive, the rule should be amended to be consistent with the current Board policy.

2. The federal air toxics program

As part of the Clean Air Act in 1970, EPA was required to promulgate National Emission Standards for Hazardous Air Pollutants (NESHAPs). These standards were developed for sources and source categories that were determined to pose adverse risk to human health by the emission of hazardous air pollutants (HAPs). The EPA Administrator was directed to set the standard "at the level which in his judgment provides an ample margin of safety to protect the public health from such hazardous air pollutant." Using this risk-based approach, EPA promulgated NESHAPs for only seven pollutants in 20 years.

In 1990, Congress altered its regulatory approach. Section 112 of the Clean Air Act requires EPA to list categories and subcategories of major sources of listed HAPs and to establish standards under section 112 of the Act for new and existing sources which: "shall require the maximum degree of reduction in emissions of the hazardous air pollutants ... that the Administration, taking into consideration the cost of achieving such emission reductions, and any non-air quality health and environmental impacts and energy requirements, determines is achievable for new or existing sources ...." CAA § 112(d)(2), 42 U.S.C. § 7412(d)(2). These standards are commonly referred to as "MACT" standards. In identifying certain pollutants as hazardous air pollutants under section 112 and regulatory sources of those pollutants, Congress made clear that the standards would be set under section 112 taking into account both the health and the environmental effects of the emissions. *See* e.g. CAA § 112(b)(3); 42 U.S.C. § 7412(b)(3); CAA § 112(c)(3); 42 U.S.C. § 7412(c)(3). The current program utilizes technology-based standards, as opposed to the original concept of NESHAPs as risk-based standards.

The MACT standards generally apply to major sources of HAPs. A major source is a stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit 10 tons per year of any HAP or 25 tons per year of any combination of HAPs. An area source is defined as any non-major stationary source. EPA has the authority to set standards for area sources under section 112. Indeed, EPA was directed to establish standards for certain types of urban air toxics sources. CAA § 112(k).

Facilities operated by the Petitioners are in source categories subject to either the Brick and Structural Clay Products Manufacturing MACT or the Clay Ceramics Manufacturing MACT. EPA recently promulgated rules for these two source categories. These MACT standards apply only to major sources within the source category. EPA decided not to regulate area sources in these source categories. See 68 Fed. Reg. 26,690, 26,691 (May 16, 2003). If a source restricts its emissions in an

enforceable permit to below the "major source" threshold by a certain date, and makes a determination of non applicability it will have met its compliance obligations under section 112. *See* 40 C.F.R. §§ 63.1(6); 63.10(b)(3).

In the Ceramics MACT, EPA concluded, "Based on the aforementioned analyses, we determined that the benefits of requiring controls for existing tunnel kilns and roller kilns do not justify the cost at this time. Therefore, we are not requiring beyond-the-floor levels controls at this time." 67 Fed. Reg. 47,894, 47,917 (July 22, 2002) (proposed rule). This position was adhered to in the final rule.

The final Brick and Structural Clay Products rule requires emissions reductions from existing tunnel kilns at major sources with design capacities greater or equal to 10 tons per hour. 68 Fed. Reg. 26,690 (May 16, 2003). EPA estimates that 68 brick and structural clay products manufacturing facilities will be affected by the final rule. The regulations include production-based emission limits for HF expressed as pounds of pollutant emitted per ton of fired product. 68 Fed. Reg. 26,716. As an alternative, facilities may achieve 90 percent reductions in HF emissions.

In the Brick and Structural Clay Products MACT, EPA concluded:

- Existing tunnel kilns with restriction on kiln operations to less than 10 tons/hour of fired product in annual average do not warrant additional controls to meet MACT.

- Existing sources of large tunnel kilns or new or reconstructed small kilns or existing large DLA controlled kiln that is rebuilt must meet an HF limit of .029 kg/mg. (.057 lb/ton) fired product.

- New or reconstructed large tunnel kilns must meet HF limit of .029 kg/mg (.057 lb/ton) fired product.

The final Brick and Structural Clay Products rule will reduce emissions of HF, HCl, and metal air toxics from existing tunnel kilns with design capacities equal to or greater than 10 tons per hour by approximately 2,300 tons annually, a 35 percent reduction from the estimated existing baseline level of emissions.

EPA estimates that the nationwide capital cost to comply with the final Brick and Structural Clay Products rule will be $63 million and that the annualized cost will be about $24 million per year. Those estimates include control and monitoring equipment costs, operation and maintenance expenses, emission testing costs, and recordkeeping and reporting costs.

As noted above, facilities operated by Petitioners are in source categories subject to one or the other of these MACT standards. Therefore, Petitioners are obligated to ensure that their facilities comply with these federal standards, or that

their emissions are restricted below the major source thresholds of 10 tons/year of any HAP or 25 tons/year of all HAPs.

IV. Conclusion

Petitioners seek an amendment to Tennessee's secondary standard for HF that will harmonize it with EPA's federal air toxics program. This proposed amendment is consistent with the goals of the Tennessee Air Quality Act.[1] Petitioners request is also consistent with TDEC's and the Air Board's stated policy goal of deferring to the federal air toxics program for those pollutants and sources addressed by EPA. Accordingly, Petitioners request that the Air Board proceed with rulemaking to revise Rule 1200-3-3-.03 as set forth on page one.

Respectfully submitted this 5th day of April 2005.

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[1] Petitioners have reviewed extensive background information of the HF standard, recent analysis on appropriate standards and information about how other states in the Region IV address HF and air toxics. While the information is not directly relevant to support the proposed regulatory amendment, which would not change the underlying standard, it is provided to put the standard adopted many years ago in context of current information and data about HF emissions. The material is included as an Appendix hereto.

ATTACHMENT 1

A. Tennessee's secondary HF standard is more restrictive than Agency for Toxic Substances and Disease Registry (ATSDR) health-based standard for HF.

The Agency for Toxic Substances and Disease Registry (ATSDR), an agency of the U.S. Department of Health and Human Services, published a revised minimal risk level (MRL) for HF in September 2003. An MRL is ATSDR's estimate of daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk of harmful (adverse), noncancerous effects. MRLs are calculated for a route of exposure (inhalation or oral) over a specified time period (acute, intermediate, or chronic). ATSDR uses the no-observed-adverse-effect-level/uncertainty factor (NOAEL/UF) approach to derive MRLs for hazardous substances. They are set below levels that, based on current information, might cause adverse health effects in the people most sensitive to such substance-induced effects. MRLs are derived for acute (1-14 days), intermediate (>14-364 days), and chronic (365 days and longer) exposure durations, and for the oral and inhalation routes of exposure. MRLs are generally based on the most sensitive substance-induced end point considered to be of relevance to humans. Exposure to a level above the MRL does not mean that adverse health effects will occur.

ATSDR has established an MRL of 0.02 parts per million (ppm) for acute-duration (1-14 days) exposures to HF via the inhalation route. This MRL is based on a minimal lowest observable adverse effect level (LOAEL) of 0.5 ppm for upper respiratory tract inflammation in humans exposed to HF. The MRL was derived by dividing the unadjusted LOAEL by an uncertainty factor of 30.

As indicated above, the health-based MRL for 1-14 day exposures to airborne HF is 0.02 ppm (20 ppb). By comparison, the Tennessee Secondary HF Standards for comparable intervals are 0.0035 ppm (3.5 ppb) and 0.0020 ppm (2.0 ppb) for 24-hour and 7-day averaging intervals, respectively. A conservative but appropriate direct comparison between these two sets of criteria - between the acute MRL and the 7-day Tennessee Standard (7 days being the midpoint in the 1-14 day exposure interval to which the MRL applies) - indicates that Tennessee's secondary HF standard is at least ten times more restrictive than ATSDR's new health-based standard for HF. As such, Tennessee's current HF Standards are more restrictive than necessary to protect the human health, especially because secondary standards historically have not been established at levels lower that primary standards set for the same interval.

B. Tennessee's current secondary HF standard is forty times more restrictive than the primary standard for a similar pollutant, Sulfur Dioxide (SO_2).

As an air pollutant, HF is similar to SO_2 in that the primary target organ/mode of toxicity is the respiratory system and these chemicals' irritating effects on the respiratory system. Also, both are soluble acidic gases that have not been classified as carcinogens.[2] Accordingly, and given that SO_2 is a chemical for which there are both recently-reviewed Federal and Tennessee primary and secondary ambient air quality standards (*see* 61 Fed. Reg. 25566 (May 22, 1996)) and ATSDR MRLs, it is useful to compare the standards established for HF and SO_2.

ATSDR has established an MRL of 0.01 parts per million (ppm) for acute-duration (1-14 days) exposures to SO_2 via the inhalation route. This MRL is based on a minimal LOAEL of 0.1 ppm for upper respiratory tract irritation (bronchoconstriction in exercising asthmatics exposed to SO_2). The MRL was derived by dividing the unadjusted LOAEL by an uncertainty factor of 9. As indicated above, the LOAEL used by ATSDR in establishing the MRL for HF was 0.5 ppm, and the resulting MRL was 0.02 ppm.

The respective LOAELs and MRLs for these two compounds would indicate that, from a human health context, SO_2 should be subject to a more stringent standard than HF. However, the national ambient air quality standards (NAAQS) for SO_2 (that have also been adopted by Tennessee) are much less restrictive than the HF standards established for comparable averaging intervals. Specifically, the current 24-hour primary NAAQS for SO_2 is 0.14 ppm, whereas the 24-hour Tennessee secondary standard for HF is 0.0035 ppm.

The comparison above indicates that Tennessee's secondary HF standard is forty times more restrictive than the primary standard for a similar pollutant, SO_2. As such, and again bearing in mind than secondary standards have not historically been established at levels lower that primary standards set for the same interval,

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[2] ATSDR 2003. Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profile for Fluorides, Hydrogen Fluoride, and Fluorine (September 2003), p. 255.

ATSDR 1998. Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profile for Sulfur Dioxide (December 1998), p. 66, 67.

ACGIH 2001. American Conference of Governmental Industrial Hygienists (ACGIH) Documentation of the Threshold Limit Values for Hydrogen Fluoride and Sulfur Dioxide (2001).

IRIS. U.S. EPA Integrated Risk Information System (IRIS) on-line information for Fluorine (soluble fluoride).

Tennessee's current HF Standards are more restrictive than necessary to protect the human health and the environment.

C. Tennessee's current secondary HF standard is more restrictive than the standards used in surrounding jurisdictions.

As illustrated below, Tennessee's regulations are more restrictive than most surrounding jurisdictions. Only Kentucky and South Carolina have an ambient standard for HF. Although Kentucky has a primary standard for HF, its emissions level is much higher than Tennessee's secondary standard. Kentucky's secondary standard also is higher than Tennessee's standard. South Carolina's numbers are similar to Tennessee, but as a practical matter, they defer to the MACT standards. North Carolina has state toxics standards for HF but exempts those that comply with federal requirements.

1. Tennessee

Tennessee's ambient air quality standard for HF is a secondary air quality standard, which defines levels of air quality believed adequate, within an appropriate margin of safety, to protect the public welfare (as opposed to public health) from any known anticipated adverse effects of the pollutant. Tennessee has a separate secondary standard for gaseous fluorides expressed as HF in the vicinity of Primary Aluminum Reduction Plants in operation before December 31, 1973.

Averaging Interval	ppb	*ppm	$\mu g/m^3$	$*mg/m^3$
30 days	1.5	0.0015	1.2	0.0012
7 days	2.0	0.002	1.6	0.0016
24 hours	3.5	0.0035	2.9	0.0029
12 hours	4.5	0.0045	3.7	0.0037

*Value not actually set forth in the Tennessee HF Standard, but derived by conversion of units.

Tenn. Comp. R. & Regs. 1200-3-3-.03 (2003).

2. Alabama

For ambient air, Alabama has incorporated by reference the primary and secondary NAAQS. Ala. Admin. Code 335-3-1-.03 (2003). Thus, Alabama has no primary or secondary ambient air standard for HF.

Alabama also has incorporated by reference the federal stationary source emission standards for source categories in 40 CFR Part 63. Ala. Admin. Code 335-3-11-.06 (2003). In addition, the Alabama Department of Environmental Management regulates fluoride emissions for certain types of facilities: superphosphoric plants, deammonium phosphate plants, triple superphosphate plants, granular triple superphosphate plants, and wet process phosphoric plants. Ala. Admin. Code 335-3-13-.02-.06 (2003).

3. Florida

Florida has not adopted an ambient air quality standard for HF. Fla. Admin. Code r. 62-204-.240 (2003).

Florida has incorporated by reference the federal regulations in 40 CFR 63, including the provisions regarding source category specific MACT standards.

4. Georgia

Georgia has not adopted an ambient air quality standard for HF. Ga. Comp. R. & Regs. r. 391-3-1-.02 (2003).

Georgia has incorporated by reference the federal regulations in 40 CFR 63, including the provisions regarding source category specific MACT standards. Ga. Comp. R. & Regs. r. 391-3-1-.02 (2003).

5. Kentucky

Kentucky has promulgated a gaseous fluorides standard under its general ambient air quality standards. The following concentrations apply at any single point location:

Contaminant	Primary Standard	Secondary Standard
Gaseous Fluorides (expressed as HF - ug/m3)		
Annual arithmetic mean	400 (0.5 ppm)	0.82 (1.00 ppb)
Maximum one month average	-	1.64 (2.00 ppb)
Maximum one week average	-	2.86 (3.50 ppb)
Maximum twenty-four hour average	800 (1.0 ppm)	3.68 (4.50 ppb)
Maximum twelve hour average	-	

Total fluorides – ppm		
Dry weight basis (as fluoride ion) in and on forage for consumption by grazing ruminants		
The following concentrations are not to be exceeded:		
Average concentrations of monthly samples over growing season (not to exceed 6 consecutive months)	-	40 ppm (w/w)
Two-month average	-	60 ppm (w/w)
One-month average	-	80 ppm (w/w)

401 Ky. Admin. Regs. 53:010 (2003).

The ambient air quality standard for HF is not to be exceeded more than once per year. Kentucky has essentially dropped its state air toxics program by repealing 401 KAR 63:022 and amending 401 KAR 63:021. At present, 401 KAR 63:002 incorporates by reference the federal regulations in 40 CFR 63, including the provisions regarding source category specific MACT standards.

6. Mississippi

For ambient air standards, Mississippi has adopted the primary and secondary federal NAAQS. Miss. Reg. APC-S-4.

For air toxics emissions standards, Mississippi also has incorporated by reference the federal standards for source categories in 40 CFR Part 63. Miss. Reg. APC-S-8.

7. North Carolina

North Carolina has adopted ambient standards only for the six criteria pollutants required under federal law. N.C. Admin. Code tit. 15A, r. 2D.00400.

North Carolina's air toxics program requires a permit for facilities that will emit hydrogen fluoride in excess of the following levels.

	Milligrams per cubic meter
Annual (carcinogens)	-
24 hour (chronic toxicants)	0.03
1-hour (acute systemic toxicants)	-
1-hour (acute irritants)	0.25

N.C. Admin. Code tit. 15A, r. 2Q.0701.

However, the regulations also state that facilities that are required to comply with MACT standards under state regulations or 40 CFR Part 63 are deemed to be in compliance unless the state determines that modeled emissions result in one or more exceedences of standards. N.C. Admin. Code tit. 15A, r. 2Q.0701.

8. South Carolina

South Carolina has adopted the following ambient air quality standards for gaseous fluorides. The regulations do not categorize the standard as primary or secondary.

Gaseous Fluorides (as HF)	Micrograms per cubic meter
12 hour average	3.7
24 hour average	2.9
1 week average	1.6
1 month average	0.8

S.C. Code Ann. Regs. 61-62.5, Std. 2 (2003).

The ambient air quality standards are not to be exceeded more than once per year. In the case of fluorides, either the double paper tape sampler methods (ASTM D-3266-79) or the sodium bicarbonate-coated glass tube and particulate filter method (ASTM D3268-78) may be used.

Hydrogen fluoride does not appear to be a regulated air toxic in South Carolina. Even if it were a regulated pollutant, those affected sources that emit HAPs and are subject to one or more Federal MACT standards are exempt from the requirements of the state air toxics program. S.C. Code Ann. Regs. 61-62.5, Std. 8 (2003).

9. Virginia

Virginia has adopted ambient standards only for the six criteria pollutants required under the Clean Air Act. 9 Va. Admin. Code § 5-30-10 (2003).

Virginia has incorporated by reference the NESHAPs for source categories designated in 40 CFR Part 63. 9 Va. Admin. Code § 5-60-90 (2003).